SECTION 07 50 20 – HD-250 –CEMENT BASE/HOT APPLIED WATERPROOFING

PART I: GENERAL

1.01 Section Includes

A. The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division One General Requirements shall be read in conjunction with and govern this section.

B. The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their work.

1.02 Description

A. Supply labor, materials, tools and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to the following:

1. Sloped Plywood Balcony Decks (by others)
2. Pli-Dek Base Coat Assembly
3. Polymer Modified Hot Fluid Applied Waterproofing Membrane
4. Protection Course
5. Drainage Composite

1.03 Related Work

A.	Division 2	Site Work
B.	Division 3	Concrete Structural
C.	Division 4	Masonry
D.	Division 5	Structural Steel
E.	Division 6	Rough Carpentry Thermal
F.	Division 7	Sealants & Flashings
G.	Division 15	Mechanical

1.04 References

A. ASTM C109: Compressive Strength of Hydraulic Cement Mortars -- Refers to 6,000 psi construction coat

B. CAN/CGSB-37.50: Hot Applied Waterproofing Membrane

1.05 Submittals

A. Prior to commencing the Work, submit shop drawings for the installation of the Pli-Dek HD 250 Waterproofing System and accessories.

B. Prior to commencing the Work, submit manufacturers complete set of standard details for Pli-Dek HD 250 Waterproofing System.

1.06 Quality Assurance

A. Perform Work in accordance with the printed requirements of the membrane manufacturer and this specification. Advise designer of any discrepancies prior to commencement of the Work.

B. Maintain one copy of manufacturer's literature on site throughout the execution of the Work.

C. At the beginning of the Work and at all times during the execution of the Work, allow access to site by the waterproofing membrane manufacturer's representative.

D. Materials used in this Section including primers, sealants and membranes, protection course, composite drainage boards and expansion joint membranes shall be fully compatible and shall be sourced and or produced by one manufacturer.

E. Pre-construction jobsite meeting between the owner's representative, general contractor, waterproofing subcontractor, Pli-Dek representative, mechanical subcontractors; to walk the prepared surface and observe the conditions to receive the waterproofing system.

1.07 Delivery, Storage and Handling

A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

B. Cold fluid applied waterproofing membrane should be stored in closed containers.

C. Store membrane at temperature of 40 degrees F and above to facilitate handling.

D. Store adhesives and primers at temperatures of 40 degrees F and above to facilitate handling.

E. Keep solvents away from open flame or excessive heat.

1.08 Enviromental Requirements

A. Store products in heated location until needed when temperatures fall below 50 degrees F.

B. Minimum working temperatures shall take into consideration a factor for wind chill. Application temperature shall be considered to be the temperature minus half of the wind speed as recommended by the National Roofing Contractors Association (NRCA).

1.09 Co-Ordination

A. Ensure continuity of the waterproofing membrane throughout the scope of this section.

B. Work shall be so scheduled as to provide a watertight seal at the end of each working day on the areas worked upon during the day.

1.10 Site Conditions

A. Environmental Requirements:

1. No installation work shall be performed during rainy or inclement weather and on frost or wet covered surfaces.

B. Protection:

1. Provide adequate protection of materials and work of this section from damage by weather backfilling operations and other causes.
2. Protect work of other trades from damage resulting from work of this section. Make good such damage at own expense to satisfaction of the consultant.
3. Apply protection course as soon as possible after installation of membrane.

1.11 Warranty

A. Contact Pli-Dek Systems, Inc for warranty information.

PART II: MATERIALS

2.01 **Materials**

A. Roof waterproofing membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

B. Acceptable Manufacturer: Pli-Dek Systems, Inc.
41610 Date Street # 104
Murrieta, CA 92562
800-364-0287
Web Site: www.Plidek.com

2.02 **HD-250 Waterproofing Membrane (Basis-of-Design)**

A. Primary waterproofing membrane shall be Pli-Dek GU80-1 Base and PD HR – Hot Applied Waterproofing Membrane manufactured by Pli-Dek, a moisture cure solvent free elastomeric waterproofing compound having the following characteristics:

HD-250 – Base Waterproofing System

1. GU80-1 Base Coat (gray): A Portland cement and silicon dioxide composition that is to be mixed with GU80-1 Liquid Admixture
2. GU80-1 Liquid Admixture: An acrylic polymer emulsion
3. G60 Galvanized Metal Lath
4. Plywood Joint Seam Tape

HR – Hot Applied Waterproofing Membrane

1. Conforms to Single-component; 100 percent solids; hot fluid-applied, rubberized asphalt complying with CAN/CGSB-37.50ASTM C 836
2. Reinforcing Fabric: Manufacturer's recommended spun-bonded polyester fabric
3. Elastomeric Flashing Sheet: 60-mil (1.3-mm) minimum, nonstaining, uncured sheet neoprene

2.03 Primer

A. Asphalt Primer:

1. Asphalt Primer; conforming to ASTM D41-85 shall be asphalt penetrating primer as manufactured by Pli-Dek.
2. Applied at 200 square feet per gallon.

2.04 Flashing, Expansion and Transition Joints

A. Exposed flashings and expansion joint membrane shall be PD Neoprene Flashing having a minimum thickness of 60 mils, manufactured by Pli-Dek Systems, Inc.

2.05 Separation Sheet

A. Granulated separation sheet membrane an asphalt impregnated protection sheet having a ceramic granule top surface, reinforced with a non-woven polyester reinforcement, designed specifically for hot mop applications, and having the following physical properties in accordance with ASTM D6164 Type 1, Grade G.
   1. Thickness: 0.140" 140 mils
   2. Tensile strength @ 0 degrees F: 113lbf/inch (md), 100 lbf/inch (xd)
   3. Elongation @ 0 degrees F: 40% (md & xd)
   4. Low temperature flexibility: - 15degrees F

2.06 Joint Treatment and Fabric Reinforcement Mesh

A. Joint Treatment and Reinforcement Mesh, open weave glass fabric yarn saturated with synthetic resins complying with ASTM D1668, Type I, shall be Pli-Dek PD-2014 Reemay Fabric manufactured by Pli-Dek Systems, Inc.

2.07 Protection Board

A. Waterproofing accessories must be obtained from an acceptable manufacturer to ensure total system compatibility and integrity.
   1. Acceptable Manufacturers:
      a. APOC 5520 Protection Panels
         West Coast – 813.248.2101
         East Coast – 562.432.6471
      b. PB4 Board – 800.241.4402

2.08 Polyurethane Termination Sealant

A. Termination Sealant shall be a polyurethane sealant; moisture cure, medium modulus polymer modified sealing compound having the following physical properties:
   1. Compatible with roofing and waterproofing membranes and substrate,
   2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A
   3. Complies with ASTM C 920, Type S, Grade NS, Class 25
   4. Remains flexible with aging.

2.09 Termination Bar

A. Termination bars shall be continuous aluminium, stainless steel or galvanized metal, 1/8" x 1" in size and shall be pre-drilled for non-corrosive screw attachment on a maximum of 8" o.c.

2.10 Prefabricated Drain Boards

A. Contact Pli-Dek Systems, Inc for job specific requirements.

2.11 Sheet Metal Flashing

A. "L" Flashing and Perimeter Flashing:
   1. 26 gauge G60 galvanized sheet metal
   2. 302 stainless steel, shall be pre-drilled for non-corrosive screw attachment as required
   3. 0.032 aluminum sheet metal

2.12 Counter Flashing

A. Counter Flashing, to match the material as installed of sheet metal flashing.

2.13 Gravel Ballast or Concrete Pavers

A. Plaza Deck Pavers: Heavyweight, hydraulically pressed, concrete units, square edged, factory cast for use as roof pavers; absorption not greater than 5 percent, ASTM C140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C78 and as follows:
   1. Size: 24 x 24 x 2"
   2. Compressive Strength: 7500 psi, minimum ASTM C 140
   3. Colors and Textures as selected by architect
   4. Available Manufacturers:
      a. Hanover Architectural Products, Inc.
      b. Wausau Tile, Inc. Terra-Paving Div.
      c. Westile
      d. Stepstone

B. Pedestal Supports: For pavers shall be in accordance with the paver manufacturers' recommendations.

C. Stone Ballast: Well screened and washed stone gravel meeting ASTM D-448-80, gradations #57, 2, 4 or 5.

D. Concrete Pour Topping.

PART III: EXECUTION

3.01 Examination

A. No observations of the existing conditions were performed prior to demolition, nor was destructive testing incorporated. The information attained is considered preliminary. This project will require an additional inspection report after demolition is preformed that will superseded the observations and will be based on the conditions exposed that currently cannot be evaluated. Representatives of the School, Consultants, Architect, General Contractor, Sub-contractor(s) and Manufacturer's Representative are recommended to observe the conditions exposed in a Pre-Construction Meeting.

B. Acceptable substrates are a minimum 16 mm, 5/8'' (3/4" recommended) sound and dry, exterior grade sheeting, Contact Pli-Dek Systems, Inc. for applications over Oriented Strand Board (OSB).

C. Lightweight concrete is an acceptable substrate provided:

1. The compressive strength of the concrete topping is minimum 2500 psi at 28 days.
2. The density of the concrete topping is minimum 115 pcf.
3. The deck is vented from the underside to facilitate drying. For composite steel deck construction, allow concrete to cure sixty (60) days.
4. For cast-in-place concrete decks, a cure period of minimum twenty-eight (28) days is required prior to application of the membrane system, except as described above for composite decks. For cure times less than the stated minimum, contact Pli-Dek representative.

D. Verify that surfaces and conditions are ready to accept the work of this section. Commencement of the work or any parts thereof shall mean acceptance of the substrate.

E. Lightweight Insulating Concrete is not an acceptable substrate.

F. Confirm the horizontal deck(s) are properly sloped to drain as required.

3.02 Preparation

A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar, frost or other contaminants. Align substrate to provide an even plane and remove scaling or latent material on the substrate. Remove any foreign matter detrimental to the adhesion of the primary waterproofing membrane or membrane flashings.

B. New concrete should be cured for a minimum of 28 days and must be dry before waterproofing membranes are applied. Concrete in vented metal pan decks must be cured a minimum of 28 days.

C. Concrete shall have a broom finish. Steel float finishes are too smooth and compromise the adhesion of the waterproofing system. Decks with a steel float finish must be sandblasted or equivalent prior to the application of the waterproofing system.

D. Prefabricated expansion joint assemblies should be in place prior to the application of the primary waterproofing assembly.

E. Substrate Preparation for Sheathing over Metal Deck or Wood Blocking:

1. Mechanically secure sheathing with type and sufficient quantity as recommended by the sheathing manufacturer and to meet maintain structure integrity and applicable code.
1. Lay sheathing with butted joints at right angles to flute direction. Joints occurring along the widths of the sheathing to continuously supported on a top flange of the metal deck.
2. Install sheathing such that all edge and end joints are supported by metal deck ribs and/or appropriate blocking. Stagger end joints of adjacent boards.
3. Prepare joints with minimum 12" wide PD-2014 Reemay Fabric placed in 90 mils of hot rubberized asphalt.
4. The contractor shall review all surfaces to receive the membrane and report any discrepancies prior to installing the waterproofing system.

3.03 Installation

A. Open the joints in the plywood deck per APA recommendations (1/8"), and cover with Pli-Dek Seam Tape (centered over joint).

B. Wipe with a brush surface to remove dust and contaminates from the surface of the flashing. Wipe the metal surface with solvent; MEK/Acetone/Xylene/Xylol/Alcohol or Vinegar.

C. Install the wall to deck "L" and perimeter flashing and secure as required.

D. Place the G60 Galvanized Metal Lath with ¾" overlaps and staple the lath with coated Crown Staples (1" x 5/8") installed 1½" o.c. on overlap seams and twelve (12) staple per square foot in the field. Mechanically attach the perimeters to the flashing with non-corrosive fasteners with two (2) rows staggered at 4" o.c.

E. GU80-1 Base Coat Mix (Gray). Mix 1 bag of GU80-1 Base Coat with 1 gallon of GU80-1 Liquid Admix, using a paddle mixer for four (4) minutes or until the material is thoroughly mixed. Place the GU80 Base Coat Mix to the expanded metal lath at the rate of 30 square foot per bag mix.

3.04 Installation of HR Hot Applied Elastomeric Membrane Application

A. Primer:
1. Apply Asphalt Primer as recommended by manufacturer and allow to dry prior to the application of the primary waterproofing membrane or membrane flashings.

B. Joint Treatment For Precast Concrete Deck:
1. Reinforce joints along length and width of units with a strip of 12” wide PD-2014 Reemay Fabric placed in 90 mils of hot rubberized asphalt.

C. Deck to Vertical Junctures:
1. Apply hot rubberized asphalt membrane to provide a thickness of approximately 90 mils to the vertical faces and a minimum of 4” out onto the horizontal surface and 6” on the vertical face.
2. Embed PD Neoprene Flashing placed in 90 mils of hot rubberized asphalt, avoiding any wrinkles or fishmouths, extending a minimum of 3” out onto the horizontal surface.
3. Mechanically attach the flashing sheet to vertical surfaces with metal termination bar where height of flashing exceeds 12”. Lap flashing sheet minimum 3” on ends.
4. At monolithic pour, use PD Neoprene Flashing fabric reinforcement as option to flashing sheet.

D. Expansion Joints (Neoprene):
1. Expansion joint membrane can be applied in a bed of primary waterproofing membrane or adhered to substrate with expansion joint adhesive. Place PD Neoprene Flashing elastomeric sheet expansion joint membrane into expansion joint adhesive as recommended by manufacturers’ written instructions.
2. Loop PD Neoprene Flashing elastomeric sheet expansion joint membrane down into expansion joint, embedded into a 90 mils thick layer of hot rubberized asphalt membrane. Ensure that the depth of loop is a minimum 1½”.
3. Extend PD Neoprene Flashing elastomeric sheet expansion joint membrane minimum of 3” on each side of joint. Seal end joints a minimum of 6” and seal with a 90 mil coat of membrane. Fill loop with membrane as required.
4. Secure top of expansion joint membrane with continuous fixing termination bar at vertical wall locations.

E. Crack Treatment:
1. Seal cracks and joints over 1/16” but less than ¼” in width with a 12” wide, PD Neoprene Flashing placed in 90 mils of hot rubberized asphalt membrane and a 6” wide strip of PD Neoprene Flashing, centered over joint.
2. Seal cracks and joints 1/8” to ¼” in width and 12” wide, PD Neoprene Flashing placed in 90 mils of hot rubberized asphalt membrane and a 6” wide strip of crack treatment or expansion joint membrane, centered over joint.

F. Membrane Flashing at Drains:
1. Coat areas around the drains with 90 mils of hot rubberized asphalt.
2. Place PD Neoprene Flashing sheet over the coated drain flange and extending a minimum 6” around the flange.
3. Apply a second coat of hot rubberized asphalt membrane over the flashing sheet at a thickness of 90 mil.
4. Apply clamping ring exerting sufficient pressure to affect a seal between clamping ring and membrane. Temporarily block all drains during the application of ballast, or other materials that might block the drains. Remove blocking when work is not in progress and upon completion.

G. Membrane Flashing at Protrusions:
1. At mechanical vent, protrusions and pipe penetrations provide flashing sheet set into 1/8 inch layer of hot rubberized asphalt membrane. Overcoat and seal with membrane. Install clamps as required.
2. At pitch pockets, place pan on top of a 90 mil layer of membrane and attach into roof deck. Set flashing sheet into 90 mils of hot rubberized asphalt membrane over top of flange. Fill pitch pocket with rubberized asphalt or rubber asphalt sealer in order to shed water.

H. Non-Exposed Membrane Flashing at Vertical Junctures:
1. Apply self-adhering waterproofing membrane to prepared substrate in lengths of 6 feet or less.
2. Horizontal to vertical inside corner transition areas are to be pre-treated with a fillet bead of polyurethane termination sealant extending ¾” vertically and horizontally from the corner. Apply a minimum 10” wide strip of 90 mils of waterproofing membrane and PD Neoprene Flashing centered at the joint.
3. All outside corners are to be pre-treated with a minimum 10” strip of waterproofing membrane centered at the joint. Apply a minimum 10” wide strip of 90 mils of waterproofing membrane and PD Neoprene Flashing centered at the joint.

4. Where three or more planes come into contact reinforce with cut sections of waterproofing membrane reinforcing sheet as per manufacturer's instructions.
5. Provide 2-1/2" laps at both sides and ends. Position for alignment and remove protective film. Press firmly into place. Promptly roll all laps with a counter top roller to affect seal. If more than one length is required on a vertical surface, apply in a shingle fashion.
6. Terminate membrane using polyurethane termination sealant and counter flashing as indicated.
7. All laps within 12" of a 90 degree change in plane are to be sealed with polyurethane termination sealant.

I. Application of Hot Rubberized Asphalt Membrane:
1. Ensure deck is ready to receive hot applied rubberized asphalt membrane.
2. Apply Asphalt Primer to the surfaces at a rate of 400 – 500 per square foot with roller or spray.
3. Apply first layer of hot rubberized asphalt membrane evenly to a minimum thickness of 90 mils to form a continuous monolithic coating over horizontal and vertical surfaces including previously reinforced areas.
4. Apply fabric reinforcing sheet and firmly press into first layer of hot membrane. Overlap fabric approximately ¼" ensuring that a layer of membrane is present between overlaps. Apply second layer of membrane over the fabric to a minimum thickness of 1/8" (125 mils) providing a total thickness of 215 mils.

J. Installation of Separation Sheet:
1. Separation Sheet shall be rolled onto hot applied rubberized asphalt membrane while still warm and tacky.
2. Lap protection course 2" on side laps and 6" on end laps.
3. Starting at the low points or drains lay the protection course membrane in full continuous sheets in a shingle pattern. Stager all end laps.

K. Flood Test:
1. Upon the completion of the Primary Waterproofing Membrane, Protection Course and all associated terminations the contractor shall flood test the system. (ASTM D 5957)
2. Provide temporary stops and plugs for the roof drains within the test area.
3. Flood test with minimum 2" of water for no less than 24 hours.
4. Repair and retest the system for no less than 24 hours, report all deficiencies to the Consultant.
5. Remove temporary stops and plugs.
6. No other Work is to proceed without prior direction from the Consultant.

3.05 Electric Field Vector Mapping (EFVM) (Alternative to Flood Test)

A. EFVM to be completed in conjunction with the completion of waterproofing and prior to placement of root barrier or any other overburden.
B. International Leak Detection, or pre-approved test provider will need to be contacted several weeks in advance to coordinate schedule.
C. In the event of a breach of the membrane, repair and retest the system for no less than 24 hours,
D. Report results of testing to the Consultant and Pli-Dek Technical Representative. Remove temporary stops and plugs.
E. No other Work is to proceed without prior direction from the Consultant.

3.06 Insulation Application (Optional)

A. Install insulation loose over the separation sheet, firmly butting each insulation board to surrounding board.
B. The end joints of the insulation shall be staggered.
C. The insulation shall be cut to fit closely to all cants, protrusions and obstructions.
D. When installing multiple layers of insulation, the thickest layer is to be installed first. Install the second layer with joints staggered with the layer below.

3.07 Installation of Protection Board (Horizontal)

A. Install Specified protection board as indicated on the drawings.
1. Clean horizontal surfaces of loose debris and unroll protection board fabric side up in the direction of maximum slope.
2. Attach protection board with double sided tape or adhesive that is compatible with waterproofing.
3. At overlaps, place adjacent panels so that cores abut.
4. Secure the fabric overlap at 5' intervals with glue or tape. All core joints must be covered by fabric overlay.
5. Place end panels so that cores abut, then glue or tape overlap.

3.08 Installation of Filter Fabric (Optional)

A. Install filter fabric over the insulation as indicated on drawings. Overlap all edges a minimum 6". Do not use lengths of less than 6 feet.
B. At all penetrations and roof drains cut and fit sections of filter fabric to surround the penetration or drain, extend up vertically and secure. Slit fabric to fit tightly over penetrations, cut out around roof drains and other openings.
C. Extend fabric up perimeter and vertical surfaces where required or as indicated on drawings.
D. Provide temporary ballasting over Filter Fabric as required preventing displacement until permanent covering material installed.

3.09 Curing and Protection

A. Allow membrane to dry thoroughly. Protect from rain until fully cured. Allow membrane to fully cure prior to installing protection board, drainage composite, covering material or backfilling. Patch or repair damaged areas using same material as original coating

3.10 Field Quality Control

A. Final Inspection and Approval: Shall be carried out by the owner's representative, the contractor and Pli-Dek representative.

3.11 Installation of Gravel Ballast or Concrete Pavers

A. Installation of gravel ballast or concrete pavers to be completed after placement of curbs details as indicated on drawings.
B. Spread gravel ballast uniformly over the installed filter fabric according to insulation manufacturer's recommendations.
C. Place concrete pavers, where indicated, on pedestals, accurately aligned, and leveled with upper surface of pavers in plane with adjacent units. Cut pavers to fit irregularly shaped areas and around protrusions. Install according to manufacturer's instructions.

3.12 Clean-Up

A. Promptly as the work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing work.
B. Clean to the consultant's approval, soiled surfaces, spatters, and damage caused by work of this Section.
C. Check area drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from the site.

END OF SECTION

Disclaimer

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